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## BANGLE

[002] This application is a national stage completion of PCT/EP2005/000432 filed January 18, 2005 which claims priority from German Application Serial No. 20 2004 000 890.4 filed January 21, 2004.

[003] FIELD OF THE INVENTION

[004] The invention relates to a bangle with an annular casing and with a liquid tank.

[005] BACKGROUND OF THE INVENTION

[006] Bangles are generally worn by women as a piece of jewelry on the wrist. Bangles of this type, differing in quality, composed of different materials and in different sizes, are known.

[007] WO 99/32007 discloses a bangle as a container for liquids with an atomizer and a hinge. In this case, the bangle comprises two parts, one part of the bangle having a cavity which is filled with perfume or another liquid. The two parts of the bangle are connected to each other via a hinge. The liquid contained in one part of the bangle can be dispensed by means of an atomizer. To cover the atomizer, a displaceable covering ring is provided which also serves to connect the two parts of the bangle to each other.

[008] The bangle known from WO 99/32007 is complicated to produce and, in particular, also difficult to operate due to the covering ring. A further problem is to reliably seal the cavity of the part which is provided for filling with the liquid. It is also a problem to ensure that the inserted liquid (perfume) does not corrode the material of the bangle.

[009] GB 2 235 861 A discloses a bangle which is composed of two sections. The sections together form a complete circle. The sections are composed in each case of a bent flat material. One of the two sections has projections on its rear side. Provision is made in this case for a liquid tank to be placed between the projections and the rear side of the bent flat material. The liquid tank has a spray head which has to be operated from the rear side of the sections. So that an operation of the spray head is possible, the latter has to be arranged, according to GB 2 235 861 A,

in an exposed manner on the rear side of the bent material. The optical effect of the bangle is therefore disadvantageously affected. In addition, the wearer of the bangle repeatedly comes into contact with the spray head. This may firstly be found unpleasant and secondly an inadvertent actuation of the spray head may not be reliably prevented.

[010] A further disadvantage of the bangle known from GB 2 235 861 A is that the latter is complicated to produce. In order to improve the optical impression of the bangle, provision is made for the two sections to be surrounded by an outer ring. Although the directly visible surface of the bangle can be improved by this means, it is not possible, and is also not envisaged, to cover the rear side of the sections, since otherwise the spray head would no longer be operable. The spray head therefore continues to come into contact with the wearer and is visible at least to keen observers. The rear sides of the sections are also visible, thus conferring a disadvantageous optical effect on the bangle *inter alia* because of the projections which are intended to fix the liquid tank in place. The bangle can therefore be used only with difficulty as an attractive decorative piece.

[011] **SUMMARY OF THE INVENTION**

[012] The present invention is therefore based on the object of providing a bangle which can be used for spraying liquids, the bangle being intended to meet the most exacting requirements both qualitatively and also visually, being intended to ensure that the liquid to be sprayed is accommodated in an advantageous manner and being intended to be simple to operate.

[013] This object is achieved according to the invention by the features of claim 1.

[014] By the annular casing of the bangle being formed from two bent tubes, with one tube being designed to accommodate the liquid tank, the liquid tank can be accommodated and connected to the annular casing in a simple manner. The formation of a separate liquid tank makes it possible for the bent tubes to be able to be formed from any desired material. Damage or corrosion of the tubes by the liquid provided for spraying is not of concern, since the liquid is accommodated in

a separate liquid tank. A further advantage of the formation of a separate liquid tank is that the latter can be changed in a rapid and simple manner, thus making it possible to use the bangle to spray different perfumes. This is virtually impossible without a separate liquid tank, since, firstly, an emptying of the liquid from the bangle is complicated and, secondly, it will be difficult to prevent residual liquid from remaining in the bangle.

[015] The formation of the bangle from two bent tubes confers a uniform appearance on the bangle. In contrast to the bangle known from GB 2 235 861 A, the overall impression is not disturbed by the rear side or underside of the bangle, i.e. the side which faces the wearer when wearing it, since the underside of the bangle is formed from the same material as the upper side. The wearing of the bangle is pleasant for the wearer, since the underside of the bangle is likewise formed from the bent tube and therefore does not have any projections, edges, corners and the like.

[016] Since the spray head of the liquid tank protrudes into the tube end or into the end-side opening of the adjacent tube, an inadvertent actuation of the same is prevented. The spray head of the liquid tank is therefore kept safe in a secure and reliable manner.

[017] It has turned out in tests that the bangle according to the invention can be produced in a simple and cost-effective manner. The two bent tubes can be produced in a simple manner from unbent tubes by the unbent tubes being bent, for example, around an arbor. Various methods are known from the general prior art for the bending of tubes. The formation of projections and the like in order to fix the liquid tank in place, as is provided in GB 2 235 861 A, can be dispensed with, as a result of which particularly cost-effective and simple production is possible.

[018] The two bent tubes can be composed of any desired basic material which may optionally be silver-plated, gold-plated, rhodium-plated or finished in another manner. The bent tubes may be produced from metal, plastic or any desired further material which makes a tubular formation possible.

[019] It is advantageous if the tube walls of the tubes have an oval contour, as viewed in cross section. As has turned out in tests, an oval contour of the tubes confers a

lightweight and thin overall impression. Furthermore, the contour which differs from a round contour makes it possible for the liquid tank to be fixed in place in the tube provided for it in a simple and twist-proof manner. As a result, the position of the spray opening of the spray head is likewise fixed in place. In addition, the oval contour of the tube wall makes it possible in a particularly simple and material-protecting manner to provide unbent tubes with the intended radius.

- [020] It is advantageous if the spray head is of oval design (in cross section).
- [021] Independently of or in addition to the oval configuration of the tube, an oval configuration of the spray head, or a configuration of the same which differs from a circular shape, permits a simple and reliable fixing of the spray head in place if the region of the tube end of the tube provided for accommodating the spray head has a shape which is matched to said spray head. The region of the tube end of the tube provided for accommodating the spray head preferably has an outlet opening which is aligned with the spray opening of the spray head. By means of the oval configuration of the tube/spray head, or a configuration of the same which differs from a circular shape, the spray opening together with the outlet opening is fixed in place in a twist-proof manner.
- [022] In a design refinement of the invention, provision can furthermore be made for the tube provided for accommodating the spray head to have, in the interior, a projection, stop or the like which serves for an actuating surface of the spray head to bear against.
- [023] The spraying function can therefore be actuated or triggered in a simple manner by means of a slight compression of the bangle or of the two adjacent tube ends, in the region of which the spray head is arranged. Provision is made in this case for the spray opening of the spray head to be aligned with the outlet opening when the actuating surface of the spray head bears against the stop of the tube. A reliable spraying of the liquid contained in the liquid tank is therefore possible.
- [024] It is advantageous if the tube for accommodating the spray head in the region of the tube end has a widened opening for accommodating the spray head.
- [025] The widened opening or the increased diameter makes it possible for the spray

head to be accommodated in a simple manner. In this case, the outer contour of the spray head can essentially correspond to the outer contour of the tube in which the liquid tank is placed. The spray head can therefore reliably close the end-side opening of this tube. The enlarged diameter of the tube end of the tube which is provided for accommodating the spray head makes it possible for the spray head to be reliably surrounded or enclosed in a simple manner. The enlarged diameter also makes it possible in a simple manner for the two tube ends, which are aligned with each other in this region, to be able to be displaced with respect to each other, so that the spraying or pumping function of the spray head can be triggered. For this purpose, the widened opening of the tube end provided for accommodating the spray head can be displaced essentially parallel to the outer contour of the other tube. A displacement of a few millimeters is sufficient here in order to trigger the spraying function. Provision may be made here for the widened opening to have one or more guide stops, latching points or the like which project into the interior, latch into correspondingly matched cutouts or depressions of the adjacent or surrounded tube and thus increase the stability of the bangle. The cutouts are designed in such a manner that the projections or the latching points can be displaced along the cutout at least within the intended actuating travel of the spray head.

**[026]** Advantageous refinements and developments of the invention emerge from the further subclaims.

**[027]** BRIEF DESCRIPTION OF THE DRAWINGS

**[028]** An advantageous exemplary embodiment of the invention is illustrated below with reference to the drawing, in which:

**[029]** Fig. 1 shows a perspective view of the bangle according to the invention;

**[030]** Fig. 2 shows a plan view of that region of the bangle according to the invention which is provided with the spray opening;

**[031]** Fig. 3 shows a plan view of the bangle according to the invention according to the arrow direction III of Fig. 2;

- [032] Fig. 4 shows a side view of the bangle according to the invention;
- [033] Fig. 5 shows a further perspective illustration of the bangle according to the invention;
- [034] Fig. 6 shows an illustration of the bangle according to the invention in an open state;
- [035] Fig. 7 shows an illustration of the bangle according to the invention in an individual illustration of the two tubes and of the liquid tank in a side view;
- [036] Fig. 8 shows a perspective illustration of the bangle according to the invention according to Fig. 7; and
- [037] Fig. 9 shows a cross section through a tube of the bangle according to the invention.

[038] **DETAILED DESCRIPTION OF THE INVENTION**

- [039] As can be seen from the figures, the bangle according to the invention has an annular casing 1 which is formed essentially from two bent tubes 2, 3. The two tubes 2, 3 are connected to each other at one end 2b, 3b by means of a hinge 4. The hinge 4 makes it possible, as illustrated in Fig. 6, to open the bangle or to pivot the two tubes 2, 3 apart at the tube ends 2a, 3a which face away from the hinge 4.
- [040] Although the bangle is formed essentially from two bent tubes 2, 3, this does not prevent these tubes 2, 3 from being composed of a plurality of tube pieces. An embodiment of this type is likewise to be understood, according to the invention, as meaning a formation from essentially two bent tubes 2, 3. A separation of the tubes 2, 3 or a composition from a plurality of tube pieces draws on the basic concept according to the invention.
- [041] As can be seen from the figures, the tube 2 is designed to accommodate a liquid tank 5. The liquid tank 5 to be accommodated is illustrated in terms of principle in Figures 7 and 8. The liquid tank 5 illustrated in the exemplary embodiment has a bend of approx. 90°. However, the configuration of the liquid tank 5 is not restricted to this. In tests, a curve radius of 90° has proven suitable firstly with regard to a twist-proof and stable arrangement and secondly in order to

be able to place the liquid tank 5 into the interior of the tube 2 without any problem.

[042] As is furthermore revealed in the figures, the tube end 3a of the tube 3 is designed to accommodate a spray head 7 of the liquid tank 5. In this case, the spray head 7 of the liquid tank 5 protrudes, when the liquid tank 5 is inserted into the tube 2, into the tube end 3a of the adjacent tube 3.

[043] As can be seen in the figures, in particular in Fig. 9, the tube walls 8, 9 of the tubes 2, 3 have, in cross section, a contour which contains characteristic features of an oval shape. The tube walls 8, 9 of the tubes 2, 3 have, in cross section, two opposite, at least approximately radius-free regions 10. The tubes 2, 3 have a width which corresponds at least approximately to double the height. The width of the tubes 2, 3 is to be understood here as meaning the extent of the tubes 2, 3 perpendicular to the plane over which the bangle stretches. Accordingly, the height of the tubes 2, 3 corresponds - apart from possible changes in shape through the operation to bend the tubes 2, 3 - to the difference between the radius of the outside and the radius of the inside of the bangle.

[044] In the exemplary embodiment, provision is made for the tubes 2, 3 to have a height of 5 to 10 mm, preferably of 7.4 mm, and a width of 10 to 20 mm, preferably 14.6 mm.

[045] These dimensions and the two opposite, at least approximately radius-free regions 10 enable the annular casing 1 of the bangle to have a thin and elegant effect. In this case, the radius-free regions 10 are formed on the "short side" of the tubes 2, 3 and therefore provide part of the height of the bangle. The radius-free regions 10 form an encircling edge of the bangle.

[046] As can be seen from the figures, the outer contour of the liquid tank 5 and the spray head 7 and the inner contour of the tube wall 8, 9 are designed such that they match each other in order for the liquid tank 5 and the spray head 7 to be arranged in a twist-proof manner. The spray head 7 and the liquid tank 5 therefore likewise have two opposite, at least approximately radius-free edge regions. Otherwise, the contour of the spray head 7 and the contour of the liquid tank 5 have characteristic features of an oval shape.

**[047]** As can be seen from the figures, the tube 3 for accommodating the spray head 7 in the region of the tube end 3a has a widened opening 12 or an enlarged diameter for accommodating the spray head 7. In addition, the tube 3 has, in the interior, a projection (not illustrated) or a stop or the like which serves for an actuating surface 14 of the spray head 7 to bear against. The stop can be configured in a simple manner by the inner contour of the tube wall 9 of the tube 3 for accommodating the spray head 7 in the region of the tube end 3a tapering, starting from the tube end 3a. The inner contour preferably tapers conically here. As soon as the inner contour falls short of the circumference of the outer contour of the spray head 7, a stop is formed for the actuating surface 14.

**[048]** As is revealed in particular in Fig. 1, Fig. 2 and Fig. 8, the tube 3 provided for accommodating the spray head 7 has an outlet opening 15 which is aligned with a spray opening 16 of the spray head 7 when the actuating surface 14 of the spray head 7 bears against the stop of the tube 3. It is therefore reliably ensured that the liquid contained in the liquid tank 5 is dispensed via the intended outlet opening 15.

**[049]** To securely fix the spray head 7 in place in the region of the tube end 3a of the tube 3 and to arrange the outlet opening 15 in an advantageous manner, provision is made for the spray head 7 to protrude essentially fully into the pipe end 3a or to be accommodated by the latter, and for the spraying operation to be triggered by pressure. In this case, the tube end 3a preferably runs linearly at least in the region which is provided for accommodating the spray head 7, or is matched to the profile of the spray head 7. The tube end 3a of the tube 3 is therefore designed to be approximately radius-free or unbent. The region of the tube end 2a which can be plugged together with the tube end 3a preferably likewise has a linear profile.

**[050]** To actuate the spraying mechanism, provision is made for the tube ends 2a, 3a, in the region of which the spray head 7 is arranged, to be compressed or pushed together. As a result, the spray head 7 is moved in the direction of the liquid tank 5 and is consequently triggered, so that a surge of spray escapes through the spray opening 16 and the outlet opening 15. In a manner not illustrated specifically, either by means of an end stop within the tube 2 or, for example, by means of a

form-fitting seal between the liquid tank 5 and the tube end 2a of the tube 2, the effect is achieved that the liquid tank 5, after it has been fixed in place in its designated position, can no longer be pushed further into the tube 2. An actuation of the spray head 7 is therefore reliably ensured.

**[051]** To obtain an advantageous optical effect, provision is made for the widened opening 12 to surround the tube end 2a. The bangle according to the invention therefore obtains a uniform and completely closed optical effect. In order to permit a stable and simple pushing together or compression of the two tube ends 2a, 3a, provision is made for the widened opening 12 to have two inwardly directed guide stops 17 which protrude or latch into a respective guide depression 18 in the region of the tube end 2a. The guide depression 18 may also be designed as a groove. The guide depression 18 extends in the direction in which the tube ends 2a, 3a are pushed together. The length of the guide depression 18 can correspond to the travel covered when pushing together the tube ends 2a, 3a. A stable guide is therefore ensured. It is advantageous if both the two guide stops 17 and the two guide depressions 18 are arranged in the regions 10.

**[052]** The widened opening 12 may be connected separately to the tube end 3a. As an alternative to this, provision may also be made for the tube end 3a to be widened by appropriate measures in such a manner that it constitutes the widened opening 12.

**[053]** As can be seen in particular from Fig. 5, the tube 2 has a viewing opening 19. In this case, the viewing opening 19 is arranged in such a manner that it faces the arm of the wearer, when the bangle is being worn, as a result of which the viewing opening 19 is difficult to see even for keen observers. The viewing opening 19 can serve in a simple manner to check the filling level of the liquid tank 5. As is furthermore revealed from Fig. 5, the tube 2 in the region of the tube end 2a has a cutout 20 facilitating the insertion of the liquid tank 5. This cutout 20 is likewise arranged in such a manner that the cutout 20 faces the arm of the wearer when the bangle is being worn.

**[054]** The liquid tank 5 may be exchanged in a simple manner. Provision is likewise

made here for the liquid tank 5 to be able to be topped up.

**[055]** The liquid tank 5 may be filled with any desired liquid, preferably with perfume. As the inventor has found out, the bangle is also suitable in an advantageous manner for defending against aggressors if, instead of perfume, the liquid tank 5 is filled with a liquid, as is the situation with pepper sprays. For this purpose, the spray head 7 may optionally be configured in such a manner that a sharp surge of spray is possible.

**[056]** As is revealed in the figures, the annular casing 1 has an oval shape or a shape slightly deviating from a circular shape. In the exemplary embodiment, provision is made for the inside diameter of the annular casing 1 to have a width of 60 to 70 mm, preferably 65 mm, and a length of 48 to 58 mm, preferably 53 mm.

**[057]** As is revealed in Fig. 6, the hinge 4 permits the two tubes 2, 3 to pivot apart in the region of the tube ends 2a, 3a in order to remove the spray head 7 from the tube end 3a. By the two tubes 2, 3 pivoting apart, it is firstly possible, in a simple manner, to change the liquid tank 5 and, secondly, in the pivoted out or open state, the bangle can be put on particularly easily and effortlessly. By means of a corresponding latching of the hinge 4 or a latching of the guide stops 17 into the guide depressions 18, the bangle can be closed again in a simple manner.

**[058]** The annular casing 1 or the tubes 2, 3 may be formed from any desired material, for example metal or sheet metal or plastic. In this case, any known type of finishing, for example gold-plating, silver-plating and the like, is possible.